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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
PHILIPPE MAZABRAUD, ET AL.	: EXAMINER: THROWER, LARRY W.
SERIAL NO: 10/527,685	:
FILED: MARCH 11, 2005	: GROUP ART UNIT: 1791
FOR: METHOD FOR ROTATIONAL MOULDING OF A WORKPIECE COMPRISING A THERMOPLASTIC FOAM LAYER	:

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the decision of the Examiner dated February 25, 2009, which finally rejected Claims 7-10 and 12-14 in the above-identified patent application. A Notice of Appeal was timely filed on August 19, 2009.

I. REAL PARTY-IN-INTEREST

The real party-in-interest is Commissariat A L'Energie Atomique having an address at 31-33 rue de la Federation 75752 Paris 15eme France .

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative, and the assignees are aware of no appeals which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 7-10 and 12-14 have been finally rejected and form the basis for this appeal. Appendix VIII includes a clean copy of appealed Claims 7-10 and 12-14.

IV. STATUS OF AMENDMENTS

No amendments after final rejection have been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER[1]

Independent Claim 7 is directed to a process for rotomoulding a part including at least one first layer, (see for example layers 13 and 15 in Fig. 2) made of a compact polymer, and a ***second*** layer (see for example layer 14 in Fig. 2) ***made of a foam polymer*** and surrounded on one face by the first layer.[2] The claimed process includes several steps. A first quantity of material is placed in the mold to make up the first layer.[3] The mold is rotated and the first quantity of material is heated to melt.[4] A second quantity of material is then placed in the mold and rotation of the mold is restarted.[5] The heating is interrupted before the second quantity of material reaches its foaming temperature, but the mold is kept rotating until ***the second quantity of material reaches the foaming temperature and as long as the second***

[1] It is Appellants' understanding that, under the rules of Practice before the Board of Patent Appeals and Interference, 37 C.F.R. § 41.37(c) requires that a concise explanation of the subject matter recited in each independent claim be provided with reference to the specification by page and line numbers and to the drawings by reference characters. However, Appellants' compliance with such requirements anywhere in this document should in no way be interpreted as limiting the scope of the invention recited in all pending claims, but simply as non-limiting examples thereof.
2 Applicant's specification from page 5, line 25 to page 6, line 10 and Fig. 2.
3 Applicant's specification at page 6, lines 11-21 and Figs. 2-3.
4 Applicant's specification at page 6, lines 21-26 and Figs. 2-3.
5 Applicant's specification at page 6, lines 26-30 and Figs. 2-3.

quantity of material remains at or above this foaming temperature, thus forming the second layer.[6]

Independent Claim 13 specifies a step of applying heat to the second quantity of material until the second quantity of material reaches ***a predetermined temperature above a melting temperature for the second quantity of material and below the foaming temperature.***[7] The mold is rotated during the step of applying heat to the second quantity of material.[8] The applying of heat to the second quantity of material is interrupted when the second quantity of material reaches the predetermined temperature below the foaming temperature.[9] After interrupting the step of applying heat to the second quantity of material, ***the rotating of the mold is maintained while the second quantity of material continues to heat by thermal inertia and exceeds the foaming temperature such that foaming occurs in the second quantity of material during said rotating, and further maintaining the rotating while the second quantity of material cools from above the foaming temperature to below the foaming temperature.***[10] The rotating is stopped after the second quantity of material has cooled below the foaming temperature. [11]

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are whether Claims 7-8, 11-12 and 13-14 are unpatentable under 35 U.S.C. § 103(a) over Carrow et al. (U.S. Patent No. 3,976,821) in view of Spencer (GB 2,288,359) as evidence from Applicant's own disclosure or Strebel (U.S. Patent No. 6,083,434); and whether Claims 9-10 are unpatentable under 35

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6 Applicant's specification from page 5, line 30 to page 7, line 8 and Figs. 2-3.
7 Applicant's specification at page 7, lines 1-3 and Figs. 2-3.
8 Applicant's specification at page 6, lines 30-31 and Figs. 2-3.
9 Applicant's specification at page 7, lines 1-3 and Figs. 2-3.
10 Applicant's specification at page 7, lines 1-10 and Figs. 2-3.
11 Applicant's specification at page 7, lines 9-10 and Figs. 2-3.

U.S.C. § 103(a) over Carrow et al. in view of Spencer as evidence from Applicant's own disclosure or Strebel, further in view of Gilman, Jr. (U.S. Patent No. 4,836,963).

VII. ARGUMENTS

Applicant respectfully requests that the rejections under 35 U.S.C. §103(a) be reversed as discussed next.

A. The applied prior art teaches away from the limitations related to the second quantity of material being a foam polymer and reaching/exceeding its foaming temperature

The final rejection of independent Claims 7 and 13 is based on the proposition that Carrow et al. discloses steps of introducing first and second materials in order to form first and second layers, and points to Column 3, lines 31-51, column 6, lines 6-58, and column 7, lines 1-17 of that document.12 The final Office Action acknowledges that Carrow et al. fails to explicitly teach that the second material is a foamable polymer. The final Office Action turns to Applicant's own disclosure and to Strebel and concludes that the second material/layer is foamable.[13]

Applicant respectfully submits that the applied prior art teaches away from the limitations related to the second quantity of material being a foam polymer and reaching/exceeding its foaming temperature. The Carrow et al. passages relied upon by the Office Action suggest that the *second* material is *not* foamable. For example, at column 6, lines 48-58, Carrow et al. teaches that the *first* material is heated "causing the *formation of bubbles* in said first continuous layer." By contrast, the second material is processed such that "said second continuous layer being at least substantially *free of said bubbles*." Thus, one of ordinary skill in the art would not find it obvious to modify the Carrow et al. process

12 Office Action at page 3, lines 1-2.
13 Office Action at page 3, lines 2-5.

by making the second material foamable and processing it until it reaches its foaming temperature thereby introducing bubbles into the second material. Such a modification would go against the explicit teachings of Carrow et al. that the second layer be free of bubbles.

The Advisory Action dated September 10, 2009, acknowledges that Carrow et al. seeks to avoid "blow holes" and "bubbles" in the second layer. The Advisory Action argues, however, that these teachings do not teach away from making the second layer foamable because these teachings merely teach "**to avoid gas bubbles from the first polymer layer**." Emphasis in the Advisory Action. Applicant respectfully disagrees. One of ordinary skill in the art would recognize that Carrow et al. teaches away from forming bubbles in the second layer in general, not just from the first polymer material. In the Carrow et al. process, bubbles are likely to form in the second layer if the second layer is formed while gas bubbling of the first polymer is on-going *because the first layer is foamable and produces bubbles*. Naturally, Carrow et al. warns against this likely source of bubbles and teaches to wait until the gas bubbling from the first polymer has ended before forming the second layer. However, one of ordinary skill in the art would understand that Carrow et al.'s teaching is not limited to avoiding bubbles from the first layer, but is more general against forming bubbles in the second layer. There is nothing special about the bubbles of the first layers. Bubbles are bubbles, and Carrow et al. teaches against bubbles in its second layer.

The secondary references (Applicant's own disclosure and Strebel) do not make such a modification obvious. These references refer to variants of the Carrow et al. process discussed above in which a first non-foamable material is first introduced, followed by the introduction of the foamable material. This is a different process than the Carrow et al. process discussed above and relied upon by the final Office Action to reject the claims, in

which a first material is introduced and processed to form bubbles in it, followed by the introduction of a second material in which no bubbles are formed.

B. The applied prior art fails to render obvious the claimed process that includes the limitations of interrupting heating the second quantity of material, followed by maintaining the rotating of the mold while the second quantity of material continues to heat by thermal inertia and exceeds the foaming temperature

The final Office Action states that Spencer teaches to rely upon thermal inertia and to interrupt the heating of a second layer, before an operating temperature is reached. Further, the final Office Action contends that overprocessing (excessively heating) a foamable polymer is known in the art in order to avoid the so-called "pop corn effect," and that it is normal to interrupt a heating as soon as possible in order to spare energy.

Applicant respectfully disagrees. Spencer does not teach to interrupt a heating of a foamable polymer layer before the foaming temperature and to rely upon the thermal inertia for achieving a controlled degree of foaming. Spencer mentions thermal inertia only before reaching an operating temperature C which appears to be a target temperature without any particular characteristic and which is therefore *not related to foaming*. The heating being interrupted "just before" this temperature C is reached, Spencer obviously *relies upon thermal inertia only* ***not to surpass*** *the temperature C.*

Further, Spencer is not at all concerned with foamable polymers, and never mentions them. Spencer aims at manufacturing an item like a bollard or a marker post (page 10, line 25) in which the second layer is not surrounded by the first layer as claimed but at another axial section (39 in Figure 7). Obviously, foamable polymers are precluded in outer parts of such items, and Spencer merely wants to juxtapose sections having different colors but very probably a similar, non-porous material.

Further, Spencer suggests a cooling immediately after temperature C has been reached (page 9; see the steep decrease in temperature in Figure 3 too) so that no foaming would occur even if this process were to be applied to a foamable polymer layer with the short time left to raise the temperature by thermal inertia after having interrupted the heating in the oven below the foaming temperature.

Finally, Spencer mentions overprocessings of the polymer only with respect to the first charge or first layer (at the top of page 8), and only to avoid a degradation thereof, so that he does not suggest to avoid overprocessing the second layer, contrary to what is asserted in the final Office Action. Spencer therefore does not fairly suggest to rely upon thermal inertia to obtain the foaming of a foamable polymer.

With respect to the "pop corn effect," Applicant respectfully submits that such an effect seems to be present in electronics, when integrated circuits are tightly enclosed in polymer housings. When die attach pads are to be soldered, this effect occurs if moisture has been trapped and evaporates so that the base of the molded plastic deforms. This is explained in US 5,449,951 for instance. See also US 6,852,427 and US 7,154,046 too. There is no evidence, however, that the "pop corn effect" is present in rotomoulding, no soldering being present and the mould being normally dry. Thus, one of ordinary skill in the art of rotomoulding would not be concerned with this effect, which is present in another technology under different conditions and not present in the applied prior art, including the Carrow et al. patent and Applicant's own disclosure.

Finally, Applicant respectfully submits that the final Office Action's argument related to energy costs is not supported. There is no evidence of record that a gentler but longer heating by inertia promoted in the claimed process for foaming spares energy at all since rotation and the corresponding mechanical energy is not interrupted during foaming.

Conclusion

It is respectfully requested that the outstanding rejections be REVERSED.

Respectfully submitted,

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IX. EVIDENCE APPENDIX

None.

VIII. CLAIMS APPENDIX

Claim 7 (Rejected): A process for rotomoulding a part including at least one first layer, made of a compact polymer, and a second layer made of a foam polymer and surrounded on one face by the first layer, the process comprising:

placing a first quantity of material to make up the first layer in a mold;

rotating the mold to form the first layer and heating the first quantity of material to melt the first quantity of material;

then placing a second quantity of material to make up the second layer in the mold and restarting rotation of the mold,

wherein the heating is interrupted before the second quantity of material reaches a foaming temperature for the second quantity of material, but the mold is kept rotating until the second quantity of material reaches the foaming temperature and as long as the second quantity of material remains at or above said foaming temperature, thus forming the second layer.

Claim 8 (Rejected): Rotomoulding process according to claim 7, wherein the heating is interrupted as soon as the mold reaches a determined temperature between a melting temperature and the foaming temperature of the second quantity of material.

Claim 9 (Rejected): Rotomoulding process according to claim 7, further comprising:

placing a third quantity of material in the mold, to make up a third layer, made of a compact polymer, when the second layer has been formed, and then the mold is rotated again and heated.

Claim 10 (Rejected): Rotomoulding process according to claim 9, wherein heating of the mold before placement of the third quantity of material is interrupted before the third quantity of material reaches its melting temperature.

Claim 12 (Rejected): Rotomoulding process according to claim 7, applied to a part for which a thickness or chemical nature of layers surrounding the foam layer is different.

Claim 13 (Rejected): Rotomoulding process according to claim 7, comprising:

applying heat to the second quantity of material until the second quantity of material reaches a predetermined temperature above a melting temperature for the second quantity of material and below said foaming temperature,

rotating said mold during said step of applying heat to the second quantity of material;

interrupting said applying of heat to the second quantity of material when the second quantity of material reaches said predetermined temperature below said foaming temperature;

after interrupting said applying of heat to the second quantity of material, maintaining said rotating of said mold while the second quantity of material continues to heat by thermal inertia and exceeds said foaming temperature such that foaming occurs in the second quantity of material during said rotating, and further maintaining said rotating while the second quantity of material cools from above said foaming temperature to below said foaming temperature; and

stopping said rotating after the second quantity of material has cooled below said foaming temperature.

Claim 14 (Rejected): Rotomoulding process according to claim 13, wherein said second quantity of material includes a powder of foaming polymer.

X. RELATED PROCEEDINGS APPENDIX

None.